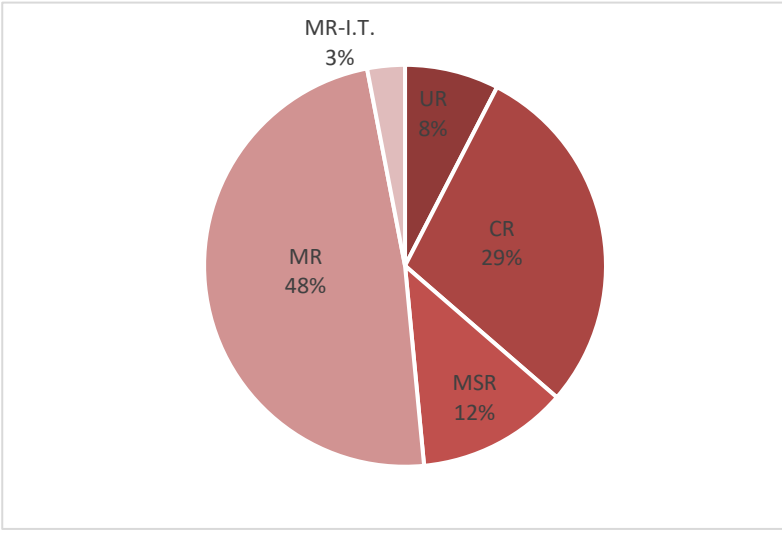
Associate Diploma of Science in Civil Engineering 2022

An Exit Qualification from the Civil Engineering 2014 B.Sc. Program

for Students Admitted to B.SC Program (2014-2022)

Program Components

Course Type	CRD
University Requirement (UR)	5
College Requirement (CR)	19
Major Support Requirement (MSR)	8
Major Requirement (MR)	32
MR-Industrial Training	2
Total Credit (CRD)	66



List of Courses

University Requirements

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ARAB 110, or HIST 122, or ISLM 101	Arabic Language Skills Modern History of Bahrain and Citizenship Islamic Culture	3	0	3	UR	------	No
HRLC 107	Human Rights	2	0	2	UR	------	No

College Requirements

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
CHEMY 101	General Chemistry I	3	3	4	CR	------	No
CSC 103	Computer Programming for Scientists and Engineers	3	2	3	CR	------	No
ENGL 101	Communication Skills I	3	0	3	CR	------	No
ENGL 102	Composition and Reading II	3	0	3	CR	ENGL 101	No
MATHS 101	Calculus I	3	0	3	CR	------	No
MATHS 102	Calculus II	3	0	3	CR	MATHS 101	No

Major Support Requirements

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
PHYCS 101	General Physics I	3	3	4	MSR	------	No
PHYCS 102	General Physics 2	3	3	4	MSR	PHYCS 101	No

Major Requirements

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
CENG 131	Surveying	3	3	4	MR	MATH 101	Yes
CENG 160	Engineering Graphics and CAD	3	3	3	MR	CSC103	Yes
CENG 201	Civil Engineering Materials	2	3	3	MR	CHEMY 101	Yes
CENG 200	Computer Applications in Civil Engineering	0	6	2	MR	CSC 103	Yes
CENG 211	Statics	3	1	3	MR	MATH102 & PHYCS 102	Yes
CENG 212	Mechanics of Materials	3	1	3	MR	CENG 211	Yes
CENG 231	Fluid Mechanics	2	3	3	MR	MATH 102& CENG 211	
CENG 242	Technical Report Writing and Presentation	1	1	1	MR	ENGL 102	Yes
CENG290	Junior Project	0	3	1	MR	CENG242	Yes
CENG 301	Quantity Surveying	3	1	3	MR	CENG 160 & CENG 302	Yes
CENG 302	Construction Engineering	3	1	3	MR	CENG160	Yes
CENG 341	Soil Mechanics	2	3	3	MR	CENG 212	Yes

Industrial Training

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
CENG 291	Industrial Training I	0	6	2	MR-Training	Completion of 45 credits	Yes

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Courses Descriptions

University Requirements Courses Descriptions

Course Code: ARAB 110 **Course Title:** Arabic Language Skills
This course focuses on basic Arabic skills, including form, function, and meaning. It also helps the student to appreciate and understand structures and approach them from a critical point of view, through various genres in literature.

Course Code: HIST 122 **Course Title:** Modern History of Bahrain and Citizenship
Spatial identity of Bahrain: Brief history of Bahrain until the 18th century; the historical roots of the formation of the national identity of Bahrain since the 18th century; the modern state and evolution of constitutional life in Bahrain; the Arabic and Islamic dimensions of the identity of Bahrain; the core values of Bahrain's society and citizenship rights (legal, political, civil and economic); duties; responsibilities and community participation; economic change and development in Bahrain; Bahrain's Gulf, Arab and international relations.

Course Code: HRLC 107 **Course Title:** Human Rights
This course deals with the principles of human rights in terms of the definition of human rights, scope, sources with a focus on the International Bill of Human Rights; The Charter of the United Nations; Universal Declaration of Human Rights; The International Covenant on Economics, Social and Culture rights; Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment; Mechanics and the Constitutional Protection of Rights and Public Freedoms in Kingdom of Bahrain.

Course Code: ISLM 101 **Course Title:** Islamic Culture
An introduction to the general outline and principles of Islamic culture, its general characteristics, its relationships with other cultures, general principles of Islam in beliefs, worship, legislation and ethics.

College Requirement Courses Descriptions

Course Code: CHEMY 101 **Course Title:** General Chemistry I
Significant figures, chemical formulas and equations; mass relations, limiting reactions and theoretical yield; Physical behavior of gases; electronic structure, periodic table, covalent bonding; Lewis structures, Molecular structures, hybridization; molecular orbitals, solutions; colligative properties. Related practical work.

Course Code: CSC 103 **Course Title:** Computer Programming for Scientists and Engineers
Introduction to computers, their uses, development, components, hardware, and software. Internal representation and numbering systems. Algorithmic problem-solving principles. Introduction to a modern programming language (e.g. C++). Input/Output, conditional statements, iteration, files, strings, functions and arrays. Lab assignments to practice programming.

Course Code: ENGL 101 **Course Title:** Communication Skills I
This course focuses on reading skills and strategies and language development. The reading section concentrates on high-interest contemporary topics and encourages students to increase speed and efficiency. The writing component, integrated to the reading materials, reviews grammatical structures, develops language accuracy and introduces paragraph writing. Students are required to upgrade their grammar, reading, and listening skills on the internet.

Course Code: ENGL 102 **Course Title:** Composition and Reading II
A continuation of English 101, which further develops the students' skills in reading and writing. The course exposes students to a wider range of reading material aimed at developing their understanding of different styles of English.

Course Code: MATHS 101 **Course Title:** Calculus I
Algebra. Functions and graphs. Trigonometry. Conic sections. Limits and continuity. Derivatives and integrals. Applications of derivatives which include mean value theorem, extrema of functions and optimization. Definite integrals and the Fundamental Theorem of Calculus.

Course Code: MATHS 102 **Course Title:** Calculus II
Applications of definite integrals, including areas, volumes and surface areas of solids of revolution, arc length and centroids. Transcendental functions, indeterminate form and L'Hopital's Rule. Techniques of integration and improper integrals. Infinite series, power series. Maclaurin and Taylor Theorem.

Major Support Courses Descriptions

Course Code: PHYCS 101 **Course Title:** General Physics I
Units and measurements; brief review of vectors; Newton's laws of motion; projectile motion; work and energy; impulse and momentum; rotational dynamics; equilibrium of a rigid body; periodic motion.

Course Code: PHYCS 102 **Course Title:** General Physics II
Electric charges and fields; Coulomb's and Gauss's laws; electric potential; capacitors and dielectrics; direct current circuits; Kirchoff's rules; magnetic field and flux; ampere's law; induced emf; Lenz's law; mutual and self inductance; AC circuits; RLC circuit.

Major Courses Descriptions

Course Code: CENG 131 **Course Title:** Surveying
Theory of errors, tape and offset surveying, levelling, theodolite, electronic distance measurement, surveying methods, setting out, circular curves, earthwork quantities, introduction to photogrammetry.

Course Code: CENG 160 **Course Title:** Engineering Graphics & Computer Aided Drawing
General introduction to engineering drawing, lettering, use of instruments and types of lines, geometrical constructions. Projections: isometric, oblique and orthographic. Simple sectional drawings. Introduction to microcomputers, AutoCAD for two dimensional drawings, architectural drawings with AutoCAD, structural drawings with AutoCAD, miscellaneous civil engineering drawings with AutoCAD.

Course Code: CENG 200 **Course Title:** Computer Applications in Civil Engineering Computers as engineering tools, review of computer basics, formulating and solving civil engineering problems, introduction to MATLAB, scalars and arrays, operations, MATLAB programming: scripts, functions, control structures, plotting. MS-Excel: basics, creating and using formulas, mathematical functions, matrix operations, solver routine, working with charts, use of Excel for solving civil engineering problems.

Course Code: CENG 201 **Course Title:** Civil Engineering Materials
Composition of concrete, properties of concrete, cement and aggregates. Proportioning, gradation, admixtures. Forms for concrete, placing and curing, properties of hardened concrete, Bituminous materials for asphalt, concrete mix design, timber.

Course Code: CENG 211 **Course Title:** Statics
Introduction to the problems of mechanics of rigid bodies, basic concepts, force and displacement as vectors, force systems, equivalent force systems. Equilibrium of force systems (static equilibrium). Analysis of simple structures: plane and space trusses, beams and frames, center of gravity, moment of inertia.

Course Code: CENG 212 **Course Title:** Mechanics of Materials
Introduction to stress and strain concepts, stresses and deformations of axially loaded members, state of stress and state of strain with emphasis on two dimensional problems. Mechanical properties of materials, Hook's law, Poisson's ratio. Normal and shear stresses and deflections in beams. Torsion of circular bars, combined stresses. Elastic and inelastic buckling of axially loaded bars. Experiments.

Course Code: CENG 231 **Course Title:** Fluid Mechanics
Fluid properties, units of measurements, fluid statics, fluid pressure, manometers, forces on surfaces, floating bodies, kinematics of fluid flow, principle of conservation of mass, equation of motion. Dynamics of fluid flow. Integration of Euler's equation, Bernoulli's equation and its applications. Momentum equation and simple applications. Dimensional analysis and similitude. Experiments.

Course Code: CENG 242 **Course Title:** Technical Report Writing & Presentation
Technical Report Writing prepares students to design and compose effective technical documents, with particular emphasis on technical reports and oral presentations. The lecture hour is dedicated to theories, techniques and presentations. The tutorial hour is assigned to discuss the written reports feedbacks.

Course Code: CENG 290 **Course Title:** Junior Project
The course is meant to develop creative design skills in the students by exposing them to some ongoing important projects in the country and requiring them to submit report on a chosen project highlighting various design components. Field trips may be arranged in coordination with the industry. The project will emphasize independent learning and teamwork. The lectures will include introduction to process instrumentation and control engineering profession, description of various areas of specialization, professional report writing techniques and the role of process instrumentation and control engineers in the society.

Course Code: CENG 301 **Course Title:** Quantity Surveying
Introduction to civil engineering contracts, methods and process of measurement, measurement of excavation and earthworks, measurement of mass and reinforced concrete, measurement of brick and brick work, measurement of masonry, painting, water proofing and metalwork.

Course Code: CENG 302 **Course Title:** Construction Engineering
Construction team and construction site activities. Site supervision and documentation. Site health and safety requirements. Earth moving and heavy construction activities. Aggregate, concrete and asphalt production. Foundation works. Concrete, structural steel and masonry construction techniques.

Course Code: CENG 341 **Course Title:** Soil Mechanics
Soils and rocks, soil classification, analytical representation of soil composition stresses in level ground; hydrostatic and excess water pressures, concept of effective stress. Permeability and its measurement, Darcy's law. Two dimensional steady flow through soils, seepage and flow nets, Mohr-coulomb shear strength theory. Measurement of shear strength parameters. Compressibility and consolidation. Experiments.

Course Code: CENG 291 **Course Title:** Industrial Training I
In this training course, all students in the program must participate in an approved training program in the relevant industry. At the completion of 300 hours of supervised training, each student must submit a formal report and conduct an oral presentation.